

Measuring The Attitudes Of Australian Food Manufacturers Towards Genetically Modified (GM) Foods – A Pilot Study

Frances Woodside, Gabriel Ogunmokun, Leslie R. Brown,
University of Southern Queensland

Abstract

Consumer acceptance of Genetically Modified (GM) foods varies amongst countries, Europeans generally show low levels of acceptance and US consumers are seen as divided in attitudes. As acceptance is essential for the adoption of new technologies in food production and the ultimate market success of new food products, this study, unlike prior Australian research, which has focused on consumer attitudes toward GM foods, investigates attitudes of Australian food manufacturers toward GM products and contrasts its findings with a prior UK study. Results indicate that because consumers are increasingly concerned about risks associated with GM foods, most manufacturers indicated that they will not use such products. These findings are generally consistent with the UK study, however there is some indication that the negative attitudes of Australian consumers toward GM products may wane as positive benefits emerge and safety issues are addressed.

Key words: Genetically Modified (GM) foods, food safety, traceability.

Introduction and Objectives of the Study

This study is a preliminary investigation about the attitudes of Australian food manufacturers toward the inclusion of genetically modified (GM) inputs into food supply chains (Alexandre, Furrer & Sudharshan 2003). Successful commercialisation of GM food products can have the potential to contribute to industry long-term profitability and growth as it can increase supply capacity and consistency of characteristics such as taste. However, the commercial success of such products is reliant on public acceptance. The challenge in developing such products lies in bridging the gap between technological changes and consumers concerns (Spetsidis & Schamel 2002). Consumer acceptance of GM foods has varied across country-markets; with European consumers showing low levels of acceptance and US consumers being divided in their attitudes (Doyle 2000). Ellahi (1996) contended that consumer acceptance is essential for new technologies in food production and their market success. As there is a lack of contemporary research into attitudes of food manufacturers, particularly in an Australian context, this study sought to investigate local food manufacturer's opinions of GM food inputs in a pilot study.

Background to the study

The underlying literature focused on public and private attitudes about GM foods, as well as input traceability and segregation in supply chains. As negative perceptions about GM foods are often driven by special interest groups, some of the technical literature was included in order to broaden the debate. Food biotechnology raises political, societal and emotional issues including: (a) what are the risks and benefits of GM foods?, (b) how are these distributed?, (c) who makes the relevant decisions? (d) how will GM foods affect local, national and international food systems?, (e) how should they be regulated and labeled, and (f) is it ethical to produce such foods in the first instance? (Nestle.M. 2003) (not the manufacturing company)..

The Macro-environment for GM foods: Food biotechnology issues are complex as is the science itself (Nestle 2003), and stakeholders in food supply chains have differing perspectives about its application to food production, including: (a) scientists developing plant species for increased production of foodstuffs to alleviate food shortages; government regulators wanting to ensure food safety and consumers who wanting safe food. Unless debate about these issues is kept on a rational plane, society's capacity to provide better and cheaper food may be jeopardised (Nestle 2003).

The Technical Environment: Using (GM) technology for new food development is controversial. It can enhance food quality by improving metabolic pathways, eliminating undesired properties, extending the shelf-life of products and offering efficiencies in production. Although these may be obvious, consumers have been critical of GM foods. However, food producers see a need to adapt to an environment in which consumer benefits from GM foods are clear to all.. This means that both producers and processors need to adopt a market-oriented approach in addressing consumer concerns (Spetsidis & Schamel 2002).

The Sociocultural Environment: The food safety and food technology issues are exemplified in consumers demands for '*natural*' foods (less technological input) (Grunert et al. 2000). A reluctance to accept technology mitigates against acceptance of emerging technologies like GM as many consumers see it in the same light as pesticides, growth hormones, and preservatives (Levy and Derby 2000). Accordingly, information about risks and benefits of GM foods needs to be communicated by the producer, particularly by effective labeling. Product development and promotion of biotechnology needs to include a deeper understanding of consumer knowledge and beliefs and must address consumer concerns about GM food to achieve better market acceptance. ,By adopting a consumer-oriented product development strategy, radical innovations in food technologies could be accepted (Spetsidis & Schamel 2002).

The Legal environment: GM Food in Australia is regulated by Standard 1.5.2 – Food Produced Using Gene Technology, of the Australia New Zealand Food Standards Code. In December 2001, these labeling provisions were enforced and required GM food to be labeled. This implied that any food, or ingredient, with a novel DNA, or has altered characteristics must be labelled. It permits up to 1% unintentional GM ingredient in without labelling (FSANZ 2003). Whereas many supermarket packaged foods may contain ingredients from approved GM commodity crops (cotton, corn, canola, soybean, sugar beet and potato), currently no fresh GM foods are commercially available in Australia (ANZFA 2001).

Traceability of Genetically Modified Ingredients: Although Standard 1.5.2 does not require a food business to establish a management system to determine the GM status of product ingredients, documentation about genetic integrity of products was proposed (FSANZ 2003, p 19). A survey of 225 grocery items from 70 manufacturers, found many Australian manufacturers were eliminating GM ingredients. Most had been auditing ingredients and additives to identify GM sources in response to ANZFA and consumer pressure about input sources. Some had not audited because the process was difficult and costly (Ragg & Leys 1999). This survey revealed that for 12 products, manufacturers could confirm GM ingredients, but for 38 products, this was not known; for a further 10 products, manufacturers would not reveal information and overall, 101 of the 225 products did not contain ingredients which could be GM sourced. Food Standards Australia New Zealand in testing for GM in common foods found that all 51 samples complied with the GM labelling standard. They also found that whilst large food businesses documented and tested to identify ingredients from

non-GM sources; smaller food businesses could not determine the GM status of suppliers (FSANZ 2003).

Consumer Attitudes Toward GM Food: Verdurme & Viane (2001, 2003) and Viane, Gellynck & Verdurme (2000) identified five factors encapsulating consumer perceptions about GM food, viz: (1) safety (health risks); (2) environmental risks; (3) perceived benefits of GM food; (4) credibility of government and industry guarantees, and (5) free choice between GM and non-GM foods. Baker & Burnham (2000), in examining these found a relationship between consumer characteristics and preferences for GM food, with consumers differentiated based, not on **who** they are, but on **what** they believe. Burton & Pearse (2003) in studying purchasing behaviour found that 30% of respondents would not buy products with GM ingredients, despite cost and health benefits. In an Australian series of studies Cormick (2000, 2002a, 2002b), found that whilst there was a slight downturn in perceived risk and benefits of GM foods, general awareness of these issues had increased. The last study showed a slight decrease in consumer confidence in GM foods, but it was still higher than in 2001. It also showed a general increase in uncertainty and concerns, *'undoubtedly driven by the high profile public debate over GM canola'* (Cormick 2002a). Other results showed that:

- 54% believed that risks of GM food are higher than benefits (51% in 2002, 49% in 2001)
- 27% believed that benefits of GM food are higher than risks (32% in 2002, 20% in 2001)
- 40% believed that the risks with GM foods would decrease over time (45% in 2002)
- 35% believed that the risks with GM foods would increase over time (30% in 2002).

An ACNielsen (2001) survey indicated that consumers did not feel well informed about GM foods but despite these apparent strong beliefs, consumers do not always react to GM labeling. Food Standards Australia (FSANZ 2003) studied the extent to which consumers use labels to make choices, and found that the most widely used label elements were (a) the use by/best before dates and, (b) ingredients and nutrition information panel (over two thirds of consumers used such information). Interestingly, the least used labeling elements were health claims i.e. allergen declarations, GM food declaration, and novel or irradiated food declaration. Two reasons were: disinterest in labels and previous and/ or positive experiences which had eliminated the need for labels (FSANZ 2003). Similarly, a 2002 survey of Australian consumer's attitudes regarding GM food, and repeated in May 2003, examined purchase decision factors such as Australian origin of products, price, health benefits, possibility of genetic modification (DPI 2003) and found that:

- Of six food purchase decision factors, only 9% of respondents rated *'not GM'* as most important in 2000, compared to 5% in 2002 – on a par with environment (9% in 2000 / 7% in 2002) and organics (4% in 2000 / 5% in 2002);
- When asked to rank factors in the decision to buy GM food: 'major health benefits', 'good for the environment' and 'better taste' were seen as most important;
- 'Price' and 'appearance' were less important in deciding to buy GM food, as were 'slight health benefits' and 'a well known brand' but these two increased in importance from 2000 to 2002; and
- There was confusion about the meaning of 'GM food' (10% were not aware of it).
-

Organisational Perceptions of Genetic Modification in Food Production: In studying organisational attitudes and company policies toward GM food, amongst UK food retailers and manufacturers Ellahi (1996) addressed the following: (a) the effect of the food industry's behaviour, (policies and attitudes toward GM foods) affects the adoption of GM products; (b) why GM products have taken longer to penetrate the food system than the health care industry; and, (c) which factors may impede the future use of GM food. It found that consumer acceptance was seen by manufacturers and retailers as essential to the success of

GM products and influenced their decisions to use such products and, in the long term, both manufacturers and retailers believed that consumers would accept GM products, with food manufacturers identifying the food retailer as being a the key to success (Ellahi 1996). Furthermore, the study found that education of both industry and consumers was important, with manufacturers believing that the industry should focus on the promotion of consumer understanding and education about GM products, as well as researching products which would recognize consumer concerns. Understanding by manufacturers of implications of labeling, and food safety was low. As little research has considered organisational perceptions about GM products, since this time, this study replicated Ellahi's (1996) UK study in an Australian context.

Research Design and Methodology

In attempting to define more specifically attitudes of Australian food manufacturers toward the use of GM food, a self-administered mail questionnaire consisting of 17 questions about their attitudes towards using GM ingredients was distributed to 452 brand managers from 158 food manufacturers identified from the Greenpeace 'Truefoods' booklet. All questions were attitudinal in nature and used a five-point Likert-type scale ranging from 1 "Strongly disagree to 5 'Strongly agree' to elicit responses. During questionnaire collection, it was found that although questionnaires were sent to 452 brand managers from the 158 companies, respondent companies only completed one questionnaire, not one for each brand as intended. In order to improve the response rate, follow-up phone calls were made and duplicate questionnaires sent to some companies. A final total of 51 usable questionnaires were received, resulting in an effective response rate of 11%. Although low, this compares with similar studies, particularly as the topic is contentious. Rates for two similar studies about GM responses were; Burton & Pearce (2002) 16% and Ellahi (1996) 24%.

Data Analysis and Results

As the Ellahi (1996) data set was unavailable, a full comparative analysis was not possible. However, descriptive analysis was conducted to investigate the sample organisations' perceptions of GM food and comparisons made to Ellahi's (1996) results. It should be noted that some social desirability bias may be present in this study where the respondent wishes to create favourable impressions for the study, and answers questions which give the socially desirable responses rather than describing their true feelings. Findings were as follows:

Australian food manufacturers intentions toward using GM foods: Most respondents answered questions about GM products with considerable intensity. Some added a comment saying that '*our company WILL NOT use GM ingredients under any circumstances*'. In this study, about a third (31%) of companies agreed that they will be considering using GM product in some cases, with just 20% agreeing that their company would consider GM ingredients on the basis of costs only. This contrasts with Ellahi's (1996) study where 81% of respondents agreed that '*our company will be considering using GM products on a case-by-case basis*'.

Importance of Traceability and Segregation: Most (94%) respondents in this study agreed that '*Traceability of ingredients is important*' and 98% disagreed with the statement '*Segregation of GM products from non-GM products is unnecessary*'. Similar results were reported in Ellahi's (1996) study. Again, most respondents agreed that '*my company believes that labelling of GM products will deter consumers from buying the product.*' Additionally,

74 % of respondents (this study) were concerned with the possibility of new allergens arising from GM products and only 16 % agreed that: *'products which are chemically identical and not distinguishable from the same unmodified product do not need to be labelled'*, indicating a preference for labelling and segregation of non-GM and GM products.

Comparison of Australian and UK Food Manufacturers: Concurrence between these results and those of Ellahi's (1996) study of UK food occurred on the following points:

- If the inserted copy gene has been destroyed by processing we do not think this food needs to be labelled to indicate its original presence (UK 63% disagree/ this study 78%).
- Labelling of all GM foods is not practical (UK 62% disagree/ this study 74 %).
- The decision to label a GM product should rest with the food manufacturer and/ or retailer (UK 74% disagree/ this study, 84%).
- GM products which are analytically equivalent to their non-modified counterparts will be indistinguishable (UK 57% disagree/ this study 57%).
- The possibility that new allergens could arise from the GM product is a concern to my company (UK 74% agree/ this study 59%).
- The cost of segregating a particular GM product from other non-modified products will override any other benefits the GM food product or ingredient may have (UK 56%, disagree/ this study 61%).
- Segregation of GM foods is necessary for labelling specifications (UK 51% agree/ this study, 73%).

Responses to the statement *'the retailer's decision to stock a product made using a particular GM product will be of paramount importance to my company'*, were mixed, most (75%), in the British study agreed but only 35% in this study agreed. Although only 26% of UK food manufacturers in Ellahi's (1996) study agreed that current regulatory guidelines on GM modified products were sufficient, 47% of Australian respondents agreed; however it should be noted that regulations have changed since Ellahi's (1996) study.

Conclusions and limitations

Existing literature indicated that food manufacturers are influenced by consumer in relation to using GM foods. In this study it was found that most organisations indicated that they would not consider using GM ingredients on the basis of cost benefits alone which was markedly different from the previous UK study results. Furthermore, issues of labeling and segregation were more widely accepted by Australian food manufacturers than in the earlier UK study. However, although cost concerns related to these issues were probably the major barrier to the consideration of using GM products, concerns in Australia about health risks associated with using GM products were important decision factors.. However, this pilot study was limited by the small sample and as such should not be seen as truly representative of Australian food manufacturers. Future research should seek larger samples in order to improve validity and replications and extensions of this study might consider more objective measures, and also longitudinal studies to probe attitude change.

References

- ACNielsen, (2001), Consumers Still In Dark On GM Food, (accessed February 9, 2003), [available at <http://www2.acnielsen.com/site/index.shtml>].
- Alexandre, M, Furrer, O & Sudharshan, D (2003), A Hierarchical Framework of New Products Development: An Example From Biotechnology, *European Journal of Innovation Management*, vol. 6, no. 1, 48-63.
- ANZFA (2001), GM Foods, (accessed May 16, 2003), [available at www.foodstandards.gov.au/meadiareleasespublications/publications/genetically/].
- Baker, G.A. and Burnham, T.A. 2002, The Market for GM Foods: Consumer Characteristics and Policy Implications, *International Food and Agribusiness Management Journal*.
- Burton, M and Pearse, D., 2003, Consumer Attitudes Towards Genetic Modification, Functional Foods, and Microorganisms: A Choice Modeling Experiment for Beer, *AgBioForum*, vol. 5, no. 2.
- Cormick, C., 2002(a), Differing Attitudes To GM Foods in Different Parts of Australia, (accessed December 21, 2002), [available at www.biotechnology.gov.au].
- Cormick, C., 2002(b), Survey Shows More Australians Would Eat GM Food Despite Concerns, (accessed December 21, 2002), [available at www.biotechnology.gov.au].
- Doyle, M., 2000, The Consumer Research Report. Philadelphia P.A: vol. 31, no. 1.
- DPI, 2003, Drivers of Consumer Behaviour GM Food, (2003), (accessed February 13, 2003), [available at www.dpi.qld.gov.au/bsu/11429.html].
- Ellahi, B., 1996, Genetic Modification for the Production of Food: The Food Industry's Response, *British Food Journal*, vol. 4, no. 5, 53-72.
- FSANZ 2003, GM Food Passes Labelling Tests, Food Standards Australia New Zealand, (accessed August 26, 2003), [available www.foodstandards.gov.au/mediareleasepublications/].
- Grunert, K., Lahteenmaki, L., Nielsen, N., Poulsen, J., Ueland, O. and Astrom, A., 2000, Consumer Perception of Food Products Involving Genetic Modification: Results from a Qualitative Study in Four Nordic Countries, (accessed January 21, 2003), [available at www.mapp.asb.dk/WPpdf/wp72.pdf].
- Nestle, M., 2003, *Safe Food, Bacteria, Biotechnology and Bioterrorism*. Los Angeles: University of California Press.
- Ragg, M., and Leys, N. 1999), *Manufacturers Shun high-tech Foods - For Now*, Business Intelligence Australia Pty. Ltd. ABIX: Australian Business Intelligence, Sunday Age, July 25.
- Spetsidis, N.M and Schamel, G. 2002, A Consumer-based Approach towards New Product Development through Biotechnology in the Agro-food Sector, Market Development for GM Foods, Faculty of Agriculture and Horticulture, Institute of Economic and Social Sciences, University of Berlin, Berlin, Germany.

Verdurme, A and Viaene, J. 2003, Consumer Beliefs and Attitude Towards GM Food: Basis for Segmentation and Implications for Communication, *Agribusiness*, vol. 19, no. 1, 91-113.

Verdume, A and Viane, J. 2003, Exploring and Modelling Consumer Attitudes Towards GM Food, *Qualitative Market Research*, vol. 6, no. 2, pp. 95-110.

Viaene, J., Gellynck, X., and Verdurme, A. 2000, Consumer Attitudes Towards Genetically Engineered Food and Development of a Segmented Communication Policy, (accessed May 14, 2003), [available at <www.vib.be/vib/sr2000/techassessment/tar_chapter5.htm>].